Syllabus of the course

«Basics of Algorithm»

Specialty	*121 Software engineering*
Study Programme	*Software engineering*
Study cycle (Bachelor, Master, PhD)	*the first (Bachelor) level of higher education*
Course status	*mandatory*
Language	*English*
Term	*third year, sixth semester*
ECTS credits	*6*
Workload	*Lectures – 24 hours.*
	Laboratory studies – 36 hours.
	Self-study – 120 hours.
	Grading including Exam
Assessment system	*Department of Information Systems* *auditorium 413 of the main building* *phone: (057) 702-18-31 (add. 2-96)* *website: http://www.is.hneu.edu.ua/*
Department	*Oleh Vasylovych Frolov, PhD in Technics, Associate professor*
Teaching staff	*O. V. Frolov oleh.frolov@hneu.net*
Contacts	*Lectures: according to the schedule* *Practical studies: according to the schedule*
Course schedule	*At the Department of Information Systems, offline, according to the schedule, individual, PNS chat.*
Consultations	*At the Department of Information Systems, offline, according to the schedule, individual, PNS chat.*

Learning objectives and skills:

mastering the theory of algorithms, principles of organization of algorithmic processes and forms of their implementation, modern and effective computer information processing algorithms, as well as methods of their research and analysis

Structural and logical scheme of the course

Prerequisites	Postrequsites
	Programming
	Algorithms and data structures
	Object-oriented programming
	Operating Systems

Course content

Module 1: *Concept of algorithm and its formalization*

Topic 1. The concept of an algorithm. Basic properties of algorithms

Topic 2. Algorithm development methods

Topic 3. Concept of computational complexity of algorithms

Topic 4. Processing of one-dimensional arrays

Topic 5. Concept of recursion. Recursive algorithms

Module 2: *Universal computational models*

Topic 6. Post's machine

Topic 7. Turing machines and machines with unlimited registers

Topic 8. Normal Markov algorithms
Module 3: *Fundamental algorithms of data processing*
Topic 9. Positional and non-positional counting systems.
Topic 10. Basic data structures
Topic 11. Algorithms for working with integers
Topic 12. Algorithms of sorting, merging and searching

Teaching environment (software)

Multimedia projector, S. Kuznets PNS, Corporate Zoom system, Microsoft Visual Studio

Assessment system

Assessment of students' learning outcomes is carried out by the University according to the cumulative 100-point system.

Current control is carried out during lectures and practical (seminar) classes and aims to assess the level of students' readiness to perform particular tasks, and is assessed by the amount of scored points.

The maximum amount during the semester – 60 points; the minimum amount required is 35 points. Final control is carried out at the end of the semester in the form of an exam (the maximum amount is 40 points, the minimum amount required is 25 points).

Current control includes the following assessment methods: assignments on a particular topic; testing; presentations, and essay writing.

More detailed information on assessment and grading system is given in the technological card of the course.

Course policies

Teaching of the academic discipline is based on the principles of academic integrity.

Violation of academic integrity includes academic plagiarism, fabrication, falsification, cheating, deception, bribery, and biased assessment.

Educational students may be brought to the following academic responsibility for breach of academic integrity: repeated assessment of the corresponding type of learning activity.